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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte RONALD W. KORZUN, CHRISTOPHER WALTER SULLIVAN, ROBERT JAMES BRACKEN, and DAVID ORUS FITTS

Appeal 2008-2137
Application 10/708,909
Technology Center 3700

Decided:[1] February 25, 2009

Before: WILLIAM F. PATE, III, JENNIFER D. BAHR, and JOHN C. KERINS, *Administrative Patent Judges*.

BAHR, *Administrative Patent Judge.*

DECISION ON APPEAL

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[1] The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, begins to run from the decided date shown on this page of the decision. The time period does not run from the Mail Date (paper delivery) or Notification Date (electronic delivery).

STATEMENT OF THE CASE

Ronald W. Korzun et al. (Appellants) appeal under 35 U.S.C. § 134 from the Examiner's decision rejecting claims 1-19. We have jurisdiction over this appeal under 35 U.S.C. § 6 (2002).

The Invention

Appellants' claimed invention is directed to steam turbines and, more specifically, to static carriers or inner shells containing nozzle blades. Specification, para. [0001]. Claim 1, reproduced below, is representative of the claimed subject matter.

> 1. A multiple group of blades for an integral covered nozzle of a turbine comprising:
>
> multiple stationary nozzle blades supported by a turbine stator;
>
> multiple respective cover portions defining a first surface configured to span tips of multiple adjacent nozzle blades between tip locations of adjacent nozzle blades thereby to form the cover portions for adjacent nozzle blades and wherein the cover portions associated with each respective adjacent nozzle blade includes facing sides for adjacent cover portions of adjacent nozzle blades; and
>
> an overcover coupled to a second surface opposite said first surface of said respective cover portions, said overcover configured to at least one of stiffen deterministic constraints of said tips and seal against leakage through said facing sides for adjacent cover portions.

The Rejections

The Examiner relies upon the following as evidence of unpatentability:

Flanders	US 2,277,484	Mar. 24, 1942
Mosser	US 2,315,641	Apr. 6, 1943
Ortolano '221	US 3,702,221	Nov. 7, 1972
Pickering	US 5,215,432	Jun. 1, 1993
Ortolano '368	US 5,238,368	Aug. 24, 1993

Appellants seek review of the Examiner's rejections under 35 U.S.C. § 103(a) of claims 1-3 and 10-12 as being unpatentable over Ortolano '221 and Pickering; claims 1-4 and 10-13 as being unpatentable over Ortolano '368, Mosser, and Pickering; claims 5, 14, and 18 as being unpatentable over Ortolano '221, Pickering, and Flanders; claims 4 and 13 as being unpatentable over Ortolano '221, Pickering, and Mosser; claims 6-9 as being unpatentable over Ortolano '221, Pickering, Flanders, and Ortolano '368; and claims 15-17 and 19 as being unpatentable over Ortolano '221, Pickering, and Ortolano '368.

SUMMARY OF DECISION

We AFFIRM.

ISSUES

The only issue presented in this appeal is: Have Appellants demonstrated the Examiner erred in determining that it would have been obvious in view of the combined teachings of Ortolano '221 and Pickering, or Ortolano '368, Mosser, and Pickering, to apply the cover and overcover

techniques taught by Ortolano '221, or Ortolano '368 and Mosser, to turbine nozzle (stator) blades?

FACTS PERTINENT TO THE ISSUE

FF1 Ortolano '221 teaches that the primary advantage of providing shrouding on tips of turbine rotor blades is to minimize vibrational forces, and thus vibrational stresses, in the blades. Ortolano '221, col. 1, ll. 16 and 32-34.

FF2 The shrouding arrangement of Ortolano '221 minimizes the tangential and axial vibrational modes and minimizes the thermal bending stresses. Ortolano '221, col. 1, ll. 43-44.

FF3 The arrangement of Ortolano '221 includes an outer shroud (overcover) 40 comprising an annular series of arcuate segments 34 fastened to blade covers 38, integrally formed on blades 36 to constitute an inner shroud 37, by deformation of tenons 39. Ortolano '221, col. 4, ll. 22-23, 29-34, and 38-44; fig. 7. Each arcuate segment 34 spans two blades. Ortolano '221, fig. 7.

FF4 Ortolano '221 teaches that the staggered relationship of the segments 34 on the blade covers 38 of the inner shroud and oblique angle of edge portions 41 of segments 34 relative to edge portions 42 of blade covers 38 help achieve better sealing against leakage of motive fluid around the shroud, since there is no direct opening through the two shrouds. Ortolano '221, col. 4, ll. 46-53.

FF5 Another advantage of the double shroud embodiment of fig. 7 of Ortolano '221 is that the inner shroud 37 offers better tip contour

for better fastening of the blades 36 to the outer shroud 40. Ortolano '221, col. 4, ll. 53-57.

FF6 Pickering teaches that is was known to support one or both ends of the stator vanes of gas turbine engines by circular rings and that an advantage of using circular inner rings for supporting the stator vanes is that they support a seal structure to limit gas bypass or air recirculation. Pickering, col. 1, ll. 10-11, 14, and 19-24.

FF7 Pickering also teaches, however, that it became common in the art to segment the inner ring or to form it of individual separate components, or vane platforms, to address the problem of differential expansion between the inner and outer rings. Pickering, col. 1, ll. 24-27.

FF8 Pickering also teaches that the vane platforms are loosely tied together with a seal carrier connected to a plurality of the vane platforms. Pickering, col. 1, ll. 28-30.

FF9 The vane platforms and seal carrier described by Pickering appear to be cover portions and an overcover configured to stiffen and seal against leakage through the interfaces between adjacent platforms, respectively.

FF10 Pickering teaches that turbulence of air flow in turbines causes vibratory excitement of the stator vanes, thereby producing stress leading to fatigue failure of the vanes. Pickering, col. 1, ll. 14 and 31-35.

FF11 Pickering notes that vane vibration causes distortion in the blade platform 14 and in the foot 16, with the relative motion being greatest between a location 22 of the platform remote from the foot

and the base end 20 of the foot. Pickering, col. 2, ll. 12-15; fig. 2. Pickering addresses this problem by securing a resilient spring damper 24 to the foot. Pickering, col. 2, ll. 16-21; fig. 2.

FF12 Ortolano '368 teaches that minimizing vibrations of turbine blading is important to minimize blade failure problems. Ortolano '368, col. 1, ll. 10-11.

FF13 Ortolano '368 further teaches providing arc cover portions 17 or 28 on the tips of the blades to minimize vibration problems. Ortolano '368, col. 1, ll. 23-30; col. 2, ll. 50-55; col. 3, ll. 41-48; figs. 2 and 5.

FF14 Mosser teaches connecting individual shroud elements 15 of turbine blades 10 with arcuate shroud or tie bands 16 using rivets or tenons 17. Mosser, col. 1, ll. 1 and 11-14; col. 2, ll. 5-8; fig. 1.

FF15 The arrangement taught by Mosser appears to be very similar to the approach described by Pickering of tying vane platforms loosely together with a seal carrier connected to a plurality of the vane platforms (FF8).

PRINCIPLES OF LAW

While the requirement of demonstrating a teaching, suggestion, or motivation (the TSM test) to combine known elements in order to show that the combination is obvious may be "a helpful insight," it cannot be used as a rigid and mandatory formula. *KSR Int'l. Co. v. Teleflex Inc.*, 550 U.S. 398, ___, 127 S. Ct. 1727, 1741 (2007). While there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness, "the analysis need not seek out precise teachings directed to the

specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *Id.*

> When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability. For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.

Id., at ___, 127 S. Ct. at 1740. We must ask whether the improvement is more than the predictable use of prior art elements according to their established functions. *Id.*

ANALYSIS

Pickering's description of loosely tying the vane platforms of stator (nozzle) vanes or blades together with a seal carrier connected to a plurality of the vane platforms (FF8) appears to satisfy the requirements of claim 1. Moreover, in any event, for the reasons that follow, Appellants' arguments do not convince us the Examiner erred in determining it would have been obvious to apply the double shroud arrangements taught by Ortolano '221 and by Ortolano '368 and Mosser to rotor blades.

As shown in our findings above, Ortolano '221, Ortolano '368, and Pickering clearly establish that the importance of minimizing vibration of both rotor blades and stator or nozzle blades or vanes to avoid blade failure

problems was well recognized in the turbine art at the time of Appellants' invention. FF1, FF10, FF12. Moreover, Ortolano '221 and Ortolano '368 both recognize that blade shrouding helps minimize vibration of blades. FF2, FF3, FF13. Accordingly, a person of ordinary skill in the turbine art would have immediately appreciated that the shrouding techniques of Ortolano '221 and Ortolano '368 and Mosser would improve nozzle blades in the same manner, namely, by minimizing vibration while also achieving a better sealing against leakage of motive fluid around the shroud, since there is no direct opening through the two shrouds FF4, FF6. While Appellants have pointed out that nozzle blades and rotor blades are differently constructed elements designed to perform different tasks and that at least some of the vibratory forces are different for nozzle blades and rotor blades (Appeal Br. 13), Appellants have not shown or explained why the nature of those differences is such that a person of ordinary skill in the art would not have expected to attain the same advantages of the shrouding systems of Ortolano '221 and Ortolano '368 and Mosser by applying them to nozzle blades. Nor have Appellants argued, much less shown, that the application of a double shroud arrangement of the type taught by Ortolano '221 or Ortolano '368 and Mosser to nozzle blades would have been beyond the technical grasp of a person of ordinary skill in the art.

CONCLUSIONS OF LAW

Appellants have not demonstrated the Examiner erred in determining that it would have been obvious in view of the combined teachings of Ortolano '221 and Pickering, or Ortolano '368, Mosser, and Pickering, to

apply the cover and overcover techniques taught by Ortolano '221, or Ortolano '368 and Mosser, to turbine nozzle (stator) blades.

Appellants thus have failed to convince us that the Examiner's rejections should be reversed.

DECISION

The Examiner's decision is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv) (2007).

AFFIRMED

JRG

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